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much more than a verbal knowledge of their definitions. It implies familiarity with the doctrines that unfold the meanings of the ideas defined. It is evident that, in respect of this matter, the scripture must read: Knowing the doctrine is essential to living the life.

C. J. KEYSER

COLUMBIA UNIVERSITY

BENJAMIN FRANKLIN THOMAS

No more unexpected and startling announcement ever came to the writer than that of the death of Professor Thomas last summer. Only a few weeks before he was apparently in rugged health and as much interested as ever in the various phases of his department of science and its applications. The workers die but the work goes on.

Professor Thomas was born at Palmyra, Ohio, October 14, 1850, and died near his summer home in Maine, July 4, 1911. He received his preparation for college under private tutorage in Fox Lake, Wisconsin, and took the degree of Master of Science at Ripon College in 1874. Then followed one year at the Fort Berthold Indian Reservation in Dakota, two years as instructor at Carlton College in Minnesota and three years as a graduate student at the Massachusetts Institute of Technology and research assistant at the Stevens Institute in Hoboken. At this last institution he earned the degree of Doctor of Philosophy in 1880. The next five years he spent as professor of physics at the University of Missouri. In 1885 he was elected to the same chair in succession to Dr. T. C. Mendenhall at the Ohio State University. To this institution he gave twenty-six years of undivided and efficient service in the cause of education. This term of service covered the critical formative period while the institution was evolving from a small "College of Agriculture and Mechanic Arts" into the great state university of the present. His compelling logic, clear mental grasp of a difficult situation, and his exceptional gift for orderly statement made his services of great value in

faculty meetings, in hearings before legislative committees, and as an expert witness in important cases of litigation.

Professor Thomas was early in foreseeing the immense expansion likely to come in applied electricity, and in 1889 he was instrumental in obtaining from the legislature an appropriation for a building and its equipment to accommodate a course in electrical engineering. This was probably the first college building ever built solely for the purpose of teaching this branch of engineering. His foresight has received abundant justification in a number of graduates in this course who have shed luster on their chosen profession and on their alma mater.

Professor Thomas's especial interest was in the subject of electrical measurements and electrical applications. He was unusually successful in developing the courses in advanced electrical measurements for engineering students; and by careful planning and persistent effort, carried on steadily through many years, he succeeded in getting together a magnificent equipment for this work. At the same time he elaborated a strong course of instruction which matched the fine equipment for effective use. He was a remarkably skilful experimenter in the study of rapidly varying electrical phenomena. His oscillograms of electric discharges and of waves of electric pressure and current are the most beautiful the writer has ever seen.

Professor Thomas's practical work as an electrical expert early led him to a thorough study of the photometry of arc and incandescent lamps, and enabled him to give valuable aid in electric lighting to many great institutions of the state, such as the Ohio Soldiers' and Sailors' Orphans Home, the state house at Columbus and the State Hospitals at Athens, Dayton and Toledo. He was for a number of years director of the Ohio Meteorological Bureau before it was merged into the United States Weather Bureau. He was also the representative for the state in the meetings called by the Bureau of Standards in Washington to confer on the subject of correct weights and measures.

Among the public positions filled by Professor Thomas was that of member of the board of examiners at the International Electrical Exhibition in Philadelphia in 1884 and of the Jury of Awards in the Department of Electricity at the Columbian Exhibition in 1893. At the latter he was placed in charge of a very elaborate test of the life and efficiency of incandescent electric lamps. The results of this prolonged test unfortunately were never published by the government. He was an expert judge of electrical instruments, machinery and processes, and he was in consequence much in demand as a consulting engineer to design the electric plants of large establishments.

As a teacher Professor Thomas excelled in the clearness and precision of his statements. These were matched by the success of his experimental demonstrations. From his students he invariably demanded solid, substantial work; he was impatient with careless or slovenly ways either in the class-room or the laboratory, and constantly held up to his classes high standards of attainment.

The new and substantial physics building at the Ohio State University is a monument to his persistent effort and to his good judgment in planning and working out various details for convenience and efficiency. In the work of his department and all that pertained to it he was indefatigable; to it he gave more than the full measure of time and energy.

Professor Thomas was a genial friend; none more so. The writer was favored with that friendship for many years, and he here gladly gives expression to his deep appreciation of all that this friendship meant to him. Only the bereaved wife, the son and the daughter know what it means to lose a faithful husband and a fond father.

HENRY S. CARHART

ATTENDANCE AT GERMAN UNIVERSITIES

THE *Deutscher Universitäts-Kalender* for the summer semester of 1912, which has just been published, contains a table showing the

enrollment of the twenty-one German universities during the winter semester of 1911-12. The table shows that there were in attendance 57,398 students, as contrasted with 57,200 for the preceding summer semester. This is, however, exclusive of 5,563 auditors, who, if added, would run the grand total to 62,961, as against 61,274 during the summer semester. The University of Berlin continues to lead the list with an enrollment of 9,829 matriculated students, of whom over 5,000 are enrolled in the faculty of philosophy, about 2,000 in the faculty of medicine (including pharmacy and dentistry), 2,412 in law, and 427 in Protestant theology. In addition there were in attendance 776 male auditors and 258 female auditors, bringing the total enrollment of the university during the past winter semester to 10,863, as against 10,720 during the winter semester of 1910-11. The Prussian University of Berlin is followed by the Bavarian University of Munich, which had an enrollment of 6,797 matriculated students and 782 auditors. The Saxon University of Leipzig ranks third with 5,170 matriculated students and 925 auditors. The remaining universities rank in point of attendance as follows: Bonn, 4,279; Breslau, 3,113; Halle, 3,112; Göttingen, 2,637; Freiburg, 2,614; Heidelberg, 2,418; Münster, 2,314; Strassburg, 2,298; Marburg, 2,014; Tübingen, 1,994; Jena, 1,831; Königsberg, 1,694; Kiel, 1,661; Würzburg, 1,583; Giessen, 1,428; Erlangen, 1,251; Greifswald, 1,228; Rostock, 955; the figures in each case being inclusive of auditors. During the winter semester of 1893-94 the universities ranked as follows: (1) Berlin, (2) Munich, (3) Leipzig, (4) Halle, (5) Würzburg, (6) Bonn, (7) Breslau, (8) Tübingen, (9) Erlangen, (10) Freiburg, (11) Heidelberg, (12) Strassburg, (13) Marburg, (14) Göttingen, (15) Greifswald, (16) Königsberg, (17) Jena, (18) Giessen, (19) Kiel, (20) Rostock, and (21) Münster. It will thus be seen that there has been no change in the order of the three largest universities, but that several institutions which were in the lower half of the list eighteen years ago, have grown sufficiently to advance